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EXAMINER	
CHAN, RICHARD	

ART UNIT	PAPER NUMBER
2618	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/732,854	HUGL ET AL.	
	Examiner	Art Unit	
	RICHARD CHAN	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/4/10*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33 and 35-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *39-41* is/are allowed.

6)☒ Claim(s) *1-6,8-14,16-19,22-33 and 35-38* is/are rejected.

7)☒ Claim(s) *7, 15, 20, and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-2, 22, 23, and 26-38 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 22, 23, and 26-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035).

With respect to claims 1 and 38, Brunner Fig.3 discloses in the method determining at least one transmit diversity branch for use based on estimated channel properties (s1) of at least two transmit diversity branches of a transmitter. Claim 1 (Col.7 line 44-58)

However, Brunner does not specifically disclose wherein two transmit diversity branches for use based on estimated channel properties and determining, in the

operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches.

The Rouquette reference however discloses a transmit diversity transmitter with where multiple branches are based on channel properties (weights Col.4 line 49-59). The diversity order characterizes the number of transmit and receive antennas which is actually seen by the code. The more transmit antenna elements are implemented, the more improvement is obtained in terms of fading and interference. (Col.2 line 39-45)

It would have been obvious to one of ordinary skill in the art to implement the multiple branches and diversity order specifically disclosed by Rouquette to the transmit diversity system of Brunner in order determine by coefficient weight measurement which transmit diversity branch to utilize of the Brunner system.

With respect to claim 2, Brunner and Rouquette combined discloses the method as defined in claim 1, wherein the determining comprises determining the at least one transmit diversity branch for use using a transmit diversity performance indicator defined for a transmit diversity branch set, the transmit diversity performance indicator being dependent on at least estimated channel properties by channel estimator of transmit diversity branches belonging to the transmit diversity branch set. Claim 2, (Col.7 line 59-64)

With respect to claim 22, Brunner and Rouquette combined discloses the method as defined in claim 1, wherein the method further comprising: allocating transmission

power evenly to physical transmit diversity branches or virtual transmit diversity branches selected for use. (Col.2 line 12-17)

With respect to claim 23, Brunner and Rouquette combined discloses the method as defined in claim 1, further comprising: transmitting information using transmit diversity branches selected for use. (col.5 line 25-45)

With respect to claim 26, Brunner and Rouquette combined discloses the method as defined in claim 1, wherein the step of determining comprises determining the at least one transmit diversity branch for use for a receiver independently of other receivers. (Col.5 line 25-45)

With respect to claim 27, Brunner and Rouquette combined discloses the method as defined in claim 1, wherein the step of determining comprises determining the at least one transmit diversity branch for a radio link independently of other radio links employed by a transmitter. Col.16 line 20-30

With respect to claim 28, Brunner and Rouquette combined discloses the method as defined in claim 1, wherein the step of determining comprises determining the at least one transmit diversity branch for use for a transmitter, for use with a receiver. Claim 1 (Col.7 line 44-58)

With respect to claim 29, Bunner discloses an apparatus comprising: a processor; a

And a memory including computer program code,

the memory and the computer program code configured to, with the processor, cause the apparatus establish estimated channel properties, channel estimator of at least two transmit diversity branches;

determine transmit diversity branches for use based on the estimated channel properties. Claim 1 (Col.7 line 44-58)

However, Brunner does not specifically disclose wherein two transmit diversity branches for use based on estimated channel properties and determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches.

The Rouquette reference however discloses a transmit diversity transmitter with where multiple branches are based on channel properties (weights Col.4 line 49-59). The diversity order characterizes the number of transmit and receive antennas which is actually seen by the code. The more transmit antenna elements are implemented, the more improvement is obtained in terms of fading and interference. (Col.2 line 39-45)

It would have been obvious to one of ordinary skill in the art to implement the multiple branches and diversity order specifically disclosed by Rouquette to the transmit diversity system of Brunner in order determine by coefficient weight measurement which transmit diversity branch to utilize of the Brunner system.

With respect to claim 30, Brunner and Rouquette combined discloses in Fig.2, the apparatus as defined in claim 30, the network element further comprising said at least two transmit diversity branches and transmitting means for transmitting information over a radio interface using selected transmit diversity branches. Claim 2, (Col.7 line 59-64)

With respect to claim 31, Brunner and Rouquette combined discloses the apparatus as defined in claim 31, a transmitter comprising a base station of a cellular communications system. Fig.2

With respect to claim 32, Brunner and Rouquette combined discloses the apparatus as defined in claim 30, said network element comprising a base station controller of a cellular communications system. Fig.2

With respect to claim 33, Brunner and Rouquette combined discloses the apparatus as defined in claim 31, said network element comprising an access point of a wireless local area network. Fig.3

With respect to claim 35, Brunner and Rouquette combined discloses the radio transmitter as defined in claim 29, the radio transmitter comprising a mobile station for a cellular telecommunications network. Fig.2

With respect to claim 36, Brunner and Rouquette combined discloses the radio transmitter as defined in claim 35, the radio transmitter comprising user equipment of a wireless local area network. Fig.2

With respect to claim 37, Brunner and Rouquette combined discloses establishing means for establishing estimated channel properties of at least two transmit diversity branches; and determining means for determining transmit diversity branches for use based on the estimated channel properties. Claim 1 (Col.7 line 44-58)

1. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) and in view of Rappaport (US 5,233,628).

With respect to claim 3, Brunner and Rouquette combined discloses the method as defined in claim 2,

However does not specifically disclose wherein the determining comprises using the transmit diversity performance indicator taking into account one or more of the following: small-scale fading statistics, and specific channel coding.

The Rappaport reference, specifically Col.16 line 20-34 discloses wherein transmit diversity performance indicator taking into account one or more of the following: small-scale fading statistics, and specific channel coding.

It would have been obvious to one of ordinary skill in the art to implement the teaching of transmit diversity performance indicator as taught by Rappaport to the method of Bunner in order to take into account a wider variety of variables affecting the channel estimation of the diversity transmitter.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) in view of Veeravalli (US 6,097,956).

With respect to claim 4, Brunner and Rouquette combined discloses the method as defined in claim 1, however Bunner does not specifically disclose wherein the step of determining the at least one transmit diversity branch for use comprises taking into account a required outage probability.

The Veeravalli reference however discloses in Claim 2, wherein the probability of outage determines the coverage provided by the transceiver.

It would have been obvious to one or ordinary skill in the art to implement taking into account the use an outage probability statistic as disclosed by Veeravalli in order to determine which transmitter branch of the Bunner diversity system should be used.

3. Claims 5, 6, 8, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) in view of Lindell (US 5,524,275).

With respect to claim 5, Brunner and Rouquette combined discloses the method as defined in claim 1, however Bunner does not specifically disclose wherein the step of determining comprises determining the at least one transmit diversity branch for use based on said estimated channel properties comprising expected powers of transmit diversity branches.

The Lindell reference however discloses an apparatus, which uses the expected power level Pexp for setting the threshold allowing the transmitter to estimate the threshold level. (Col.5 lines 35-43)

It would have been obvious to one of ordinary skill in the art to implement the use of expected power level value as disclosed by Lindell with the transmitted diversity system of Bunner in order to determine threshold values that need to met by the diversity branches.

With respect to claim 6, Bunner and Lindell combined discloses the method as defined in claim 5, Lindell continues to disclose wherein the step of determining comprises evaluating a transmit diversity performance indicator using said expected powers. (Col.5 lines 35-42)

With respect to claim 8, Brunner and Rouquette combined and Lindell combined disclose the method as defined in claim 6, Bunner further discloses the method comprising the steps of: evaluating said transmit diversity performance indicator for

various transmit diversity branch sets and selecting for use the transmit diversity branch set having an optimum transmit diversity performance indicator value. Col.16 line 30-34

With respect to claim 10, Brunner and Rouquette combined and Lindell combined discloses the method as defined in claim 6, Lindell continues to disclose wherein the step of determining comprises evaluating the transmit diversity performance indicator defining a branch power threshold for adding a further transmit diversity branch to a transmit diversity branch set for use, the branch power threshold Pmax being dependent on the expected powers of the transmit diversity branches already selected to the transmit diversity branch set for use. (Col.3 lines 59 to Col.4 line 6)

With respect to claim 11, Brunner, Rouquette, and Lindell combined discloses the method as defined in claim 10, Lindell continues to disclose wherein the step of determining comprises selecting the transmit diversity branches to the transmit diversity branch set for use in an order in accordance with estimated expected powers. (Col.5 lines 35-42)

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) in view of Lindell (US 5,524,275) in further view of Conklin (US 6,415,283).

With respect to claim 9, Brunner, Rouquette, and Lindell combined discloses the method as defined in claim 8, however neither reference discloses wherein the step of evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.

The Conklin reference in Fig.4 however discloses child nodes using a tree structure 220 in Fig.4 to evaluate using weighted summing in order to choose the correct child node. (Col.5 lines 63- Col.6 lines 15)

It would have been obvious to one of ordinary skill in the art to implement the tree structure as disclosed by Conklin to the Diversity transmitter system of Bunner and Lindell in order to calculate the appropriate transmission branch to be sending out a transmission signal.

5. Claims 12, 13, 14, 16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) in view of Mitra (US 5,956,649).

With respect to claim 12, Brunner and Rouquette combined discloses the method as defined in claim 1, however does not specifically disclose wherein the step of determining comprises determining the at least one transmit diversity branch for use

based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches.

The Mitra reference claim 12 discloses wherein a coefficient times a second or higher order statistic of the interference signal will determine a signal path gain between the communications device and base unit.

It would have been obvious to one of ordinary skill in the art to implement second order channel coefficient as disclosed by Mitra in order to calculate the channel the optimal transmit diversity branch to the diversity transmitter system of Messier.

With respect to claim 13, Brunner, Rouquette, and Mitra combined discloses the method as defined in claim 12, Mitra continues to disclose wherein the step of determining comprises evaluating a transmit diversity performance indicator using said second order statistics. Claim 12 of Mitra.

With respect to claim 14, Brunner, Rouquette, and Mitra combined disclose the method as defined in claim 12, Mitra continues to disclose wherein the step of determining comprises using the second order statistics comprising at least one correlation matrix calculated using estimated channel coefficients. (Col.8 lines 47-62)

With respect to claim 16, Brunner, Rouquette, and Mitra combined disclose the method as defined in claim 13, Bunner further discloses the method comprising: evaluating said transmit diversity performance indicator for various transmit diversity

branch sets and selecting for use the transmit diversity branch set having an optimum transmit diversity performance indicator value. (Col.4 lines 11-20)

With respect to claim 18, Brunner, Rouquette, and Mitra combined disclose the method as defined in claim 12, Mitra further discloses the method comprising: constructing virtual transmit branches RF as linear combinations of physical transmit diversity branches, and wherein the estimated channel properties comprise expected powers of said virtual transmit branches. (Col.8 lines 59-63)

With respect to claim 19, Brunner, Rouquette, and Mitra combined disclose the method as defined in claim 18, wherein the step of constructing comprises constructing the virtual transmit branches as Eigenvectors “Perron-Frobenius” of a channel correlation matrix derived from estimated channel coefficients and expected powers of the virtual transmit branches are determined as Eigenvalues of respective Eigenvectors. (Col.10 lines 44-62)

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over of Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) in view of Mitra (US 5,956,649) and further in view of Conklin (US 6,415,283).

With respect to claim 17, Brunner, Rouquette, and Mitra combined disclose the method as defined in claim 16, however neither reference specifically discloses wherein

the step of evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.

The Conklin reference in Fig.4 however discloses child nodes using a tree structure 220 in Fig.4 to evaluate using weighted summing in order to choose the correct child node. (Col.5 lines 63- Col.6 lines 15)

It would have been obvious to one of ordinary skill in the art to implement the tree structure as disclosed by Conklin to the Diversity transmitter system of Bunner and Lindell in order to calculate the appropriate transmission branch to be sending out a transmission signal.

7. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Brunner (US 7,039,368) in view of Rouquette et al. (US 7,308,035) in view of Whinnet (US 6,317,411)

With respect to claim 24, Bunner and Rouquette combined discloses the method as defined in claim 1, further comprising: estimating channel properties using channel coefficients at a estimating channel properties using channel coefficients at a transmitter.

The Whinnet reference however discloses wherein estimating channel properties using channel coefficients at a receiver. (Col.2 lines 42-49)

It would have been obvious to one of ordinary skill in the art to implement the coefficient at the receiver in order to able determine the channel properties for reception to quantify the input signal strength to properly receive the highest quality signal.

With respect to claim 25, Bunner and Rouquette combined discloses the method as defined in claim 1, however does not specifically disclose wherein the method is further comprising: estimating channel properties using channel coefficients at a receiver.

The Whinnet reference however discloses wherein estimating channel properties using channel coefficients at a receiver. (Col.2 lines 42-49)

It would have been obvious to one of ordinary skill in the art to implement the coefficient at the receiver in order to able determine the channel properties for reception to quantify the input signal strength to properly receive the highest quality signal.

Allowable Subject Matter

8. Claims 7, 15, 20, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 7, Bunner and Lindell combined disclose the method as defined in claim 6, however the prior art does not specifically disclose wherein the step of determining comprises calculating the transmit diversity performance indicator using the following formula: 12 k = F 0 m = 1 k m k ,where F.sub.0 denotes the required outage probability, .lambda..sub.m denotes the expected power of an m-th transmit diversity branch in a transmit diversity branch set .THETA., and .THETA. is the number of transmit diversity branch indexes in the transmit diversity branch set .THETA..

With respect to claim 15, Bunner and Mitra combined discloses the method as defined in claim 14, however the prior art does not disclose wherein the step of determining comprises calculating the transmit diversity performance indicator using the following formula: 13 = F 0 m = 1 u m ,where F.sub.0 denotes the required outage probability, u.sub.m denotes an m-th Eigenvalue of a correlation matrix relating to a transmit diversity branch set .THETA., and .THETA. is the number of transmit diversity branch indeces in the transmit diversity branch set .THETA.

With respect to claim 20, Bunner and Mitra combined disclose the method as defined in claim 18, however the prior art does not specifically disclose wherein the step of determining comprises determining the at least one transmit diversity branch using a transmit diversity performance indicator defining a branch power threshold for adding a further virtual transmit branch set for use, the branch power threshold being dependent on the expected powers of the virtual transmit branches already selected to the virtual

transmit branch set for use. The prior art discloses a power threshold leveling order to designate the appropriate transmission branch, however not based on expected powers.

Claim 21 is dependent on objected claim 20.

Claims 39-41 are allowed

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RICHARD CHAN whose telephone number is (571)272-0570. The examiner can normally be reached on Mon-Fri 10AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571)272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nay A. Maung/
Supervisory Patent Examiner, Art Unit 2618
5/11/10

/Richard Chan/
Examiner, Art Unit 2618